Project Deliverable D1.2

- Summary of fire risk perception and land management approaches amongst European experts-

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List of Acronyms

EFFIS	European Forest Fire Information System
ESR	Early Stage Researcher
JRC	Joint Research Centre
UNISDR	United Nations Office for Disaster Risk Reduction
WP	Work Package

Executive Summary

This deliverable presents an overview of how and why wildfire risk perception is relevant to wildfire research in Europe, as well as the implications of this not only in terms of policy and land management, but also for building socio-ecological resilience in fire-prone territories. Here we provide a specific focus on the region of Southern Europe, particularly in the Iberian Peninsula (Spain and Portugal) because of the high wildfire proneness and incidence in these two Mediterranean countries. We briefly consider the implications of these findings within a wider European context. In addition to the specific focus on risk perceptions, the work further provides a more holistic framing of socio-ecological resilience in the face of wildfires, in which risk perception and awareness are one element of a wide arrange of variables operating in complex fire-prone socio-ecological systems. The contents of this deliverable are primarily building upon the research project done in pursue of the PhD degree of ESR1.

1. Introduction

Wildfires as natural processes

Wildfires have been part of European landscapes dating from the Neolithic agricultural revolution in which fire was used as the principal path of natural vegetation clearance for agriculture and pastoralism landscapes (Tedim, et al. 2015).

Narrowing the focus down to the Mediterranean basin, evolutionary and paleoecological studies show that wildfires are natural phenomena in these areas and have impacted the configuration of the biodiversity, considering it as part of the natural process (Pausas et al. 2008, 2012). Southern European countries are fire-prone due to their Mediterranean climate. Mediterranean climates are characterized by cool and wet winters season that stimulate vegetation (fuel) growth and warm and dry summers that increase vegetation flammability (Moreira et al. 2020). These conditions make it easier to ignite and spread, particularly during the summer season (Lelouvier et al. 2021).

This, along with long-term human presence in Mediterranean areas, makes wildfires a natural dynamic that has shaped southern Europe's ecological and human dynamics (Moreira et al. 2020; Tedim et al. 2016).

The wildfire issue in Southern Europe (factors)

Currently, 85% of the total burned area in Europe takes place in Portugal, Spain, France, Italy, and Greece, namely, the largest 5 Mediterranean countries in Europe (de Rigo et al. 2017). These countries hold an average 45,000 wildfire occurrences every year, burning around 350,000 hectares between 2010 and 2017 (see figure 1) (Rego et al. 2018) and causing significant damage to human lives and assets, as well as damage to forest ecosystems, thus jeopardizing the provision of ecosystem services (Moreira et al. 2011; Wunder et al. 2021). It is important to highlight, however, that most of this damage is caused by extreme wildfire events, despite only representing around 2% of the total number of fires (Rego et al. 2018)

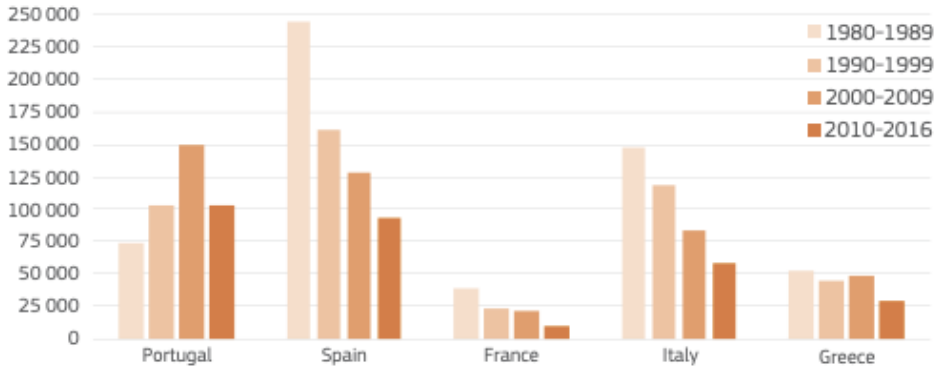

Figure 1: Average area burned (ha) per year by forest fires over the last four decades (1980 -2016) in southern Europe. Source: Rego et al., 2018

Despite the undeniable relevance of climate change effects, it is generally understood that the main drivers related to the increase in wildfires and burned areas in Southern Europe are related to land-use change (Pausas et al. 2008; Pausas and Paula 2012) although there is still ongoing research on the exact role that different factors such as climate, wind or the efficiency of the fire suppression system are playing in the wildfire regimes in Mediterranean Europe (Brotons et al. 2013; Duane, Aquilué, et al. 2019; Duane, Kelly, et al. 2019). This land-use change is, in exchange, strongly linked to the rural exodus. Migration fluxes from the countryside to urban areas lead to land abandonment (Frei et al. 2020), which translated into a fuel buildup of extensive and continuous fuels (vertically and horizontally). This phenomena, coupled with the abandonment of traditional activities (mainly livestock grazing and agriculture) as well as wildfire management policies focused largely on suppression, have directly affected the size of wildfires (Pausas et al. 2008). In particular, the phenomena of increased wildfire risk due to policies focused on suppression instead of prevention receives the name of “wildfire paradox” (Castellnou et al. 2019).

Despite the fact that wildfires are a natural component of Mediterranean territories (Pausas et al., 2012), the increasing frequency and severity of wildfires is of concern. And wildfires are considered one of the main risks faced by forests and wooded areas in southern Europe (Rego et al., 2018). This is mainly due to the changing wildfire regime, and the fact that a reduced number of ignitions (<15%) account for most of the burnt area (Alcasena et al., 2019).

Whereas the definition of what an “extreme wildfire event” is still contested (Tedim et al. 2018), it is safe to say that these wildfires within Mediterranean Europe typically spread over long distances, showing active crown fire, and often occur simultaneously to other fire events during heat waves (Alcasena et al. 2019). The extreme behavior that these fires show, combined with simultaneity and the affection of wildland-urban interface (WUI) areas, is particularly worrying in Mediterranean areas (Alcasena et al. 2019), as it often leads to more severe damage in critical infrastructure and an increased risk to human lives, such as the events of 2017 showed in Portugal, with the loss of 118 lives or the 2018 wildfires in Greece, that killed 102 people (Haynes et al. 2020).

Importance of the deliverable

Southern Europe is a highly fire-prone region, in which the Mediterranean-type climate conditions, coupled with the fuel build-up, driven by social and land-use changes, i.e. rural and agricultural

abandonment and shrubland growth, has intensified the recurrence and size of wildfires (Fernandes et al., 2014). In this context, we aim to shed light on how wildfire risk is perceived in southern European countries, acknowledging the potential to "*influence the range of actions undertaken to reduce them*" (Flint & Luloff, 2005 p.408).

2. Methodology

The results of this deliverable are based on a literature review that was carried out on existing studies in English, Spanish and Portuguese languages of wildfire risk and risk perception, with a focus on southern European countries. This literature review had three main goals: (i) to set the scene of the wildfire issue in southern Europe, (ii) to elaborate the discussion on the terminology of wildfire risk, and wildfire risk perception and (iii) to complement the empirical field data on wildfire risk perception and land management among different stakeholder groups in Mediterranean Europe.

The literature review was carried out using key wildfire related terms, and was not limited to scientific literature, but also included grey literature, mainly from international (e.g. UNISDR) and European bodies (e.g. JRC, EFFIS). The search terms included "risk", "wildfire"/"fire"/"forest fire", and "perception", in different combinations, as well as "land management" and "land abandonment". We also built upon the literature review already carried out for the PhD research of ESR1.

Our findings in the literature were compared to the pertinent empirical data collected by ESR1 in the frame of her PhD research in Spain and Portugal. This research comprises of two case studies in Spain (Catalonia and Valencia) and one in Portugal (nation-wide). These case studies follow a qualitative, case-study methodology (Yin 2009).

To this date, empirical data comprises a total of 53 semi-structured interviews. The 53 interviews were undertaken both online and in-person, depending on the covid-19 situation and interviewee availability. In Spain interviews are being carried out largely in-person, and the people interviewed ranged from wildfire volunteers, to environmental activists, researchers as well as decision-makers at different scalar levels. In Portugal, interviews are not finished yet and have been thus far more focused at the national level, including Portuguese researchers studying the social dimension of wildfires in the country, as well as representatives from different agencies playing a role in wildfire prevention and suppression. Interviews were carried out in Spanish, Catalan, Portuguese and English depending on the convenience for both interviewer and interviewee, and they were recorded, transcribed and are currently being analysed using MAXQDA©, a programme for qualitative data analysis. Here we present the preliminary results of these of these semi-structured interviews alongside the detailed literature reviews.
Despite each interview being always slightly different, they all had wildfire as core topic, and wildfire risk perception was a recurrent issue, even when there were not specific questions on the topic. This was particularly evident when the interviewee worked professionally on wildfires (either on prevention or suppression).

3. Risk perception and related land management

3.1 Definition of risk and wildfire risk

Defining risk

The Merriam-Webster dictionary defines risk as "*the possibility of loss or injury*", suggesting "peril" as a synonym (Anon n.d.). Along the same lines, but a little bit more specific is the definition of "disaster risk" of the United Nations Office for Disaster Risk Reduction (UNDDR) (2009): "*The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity*". This definition implies that risk is a function not only of the possibility of a shock or a disaster to occur, but also of how well- or ill-equipped is the system is to face that shock. On the same note, the Intergovernmental Panel on Climate Change (IPCC) (2012) defines risk as a function of hazard, exposure, and vulnerability. It is possible to notice how some terms are repeatedly linked to the notion of risk such as hazard, exposure or vulnerability. For the sake of clarity, we introduce a box below with a small glossary of these terms, following the UNDDR Glossary (UNDRR 2017).

Hazard
A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation.

Exposure
The situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas.

Vulnerability
The conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards*. (Positive factors are referred to using the terms of "Capacity" and "coping capacity")

Capacity
The combination of all the strengths, attributes and resources available within an organization, community or society to manage and reduce disaster risks and strengthen resilience. Capacity may include infrastructure, institutions, human knowledge and skills, and collective attributes such as social relationships, leadership and management.

Source: UNDDR Glossary

The definitions of risk presented above, and most definitions used nowadays in the wildfire field, build upon a technical understanding of the term, in which the undesired event occurring denotes and highlights the negative outcome and its capacity to be measured objectively. However, we acknowledge the existence of other approaches to risk, coming mainly from socio-constructivist approaches, which understand risk more as a mental state, in contrast to the statistical probability (Douglas & Wildavsky,

1982 in Flint & Luloff, 2005). These approaches understand that risk is not a material object, and it cannot be "sensed". As a consequence, any perception of such risk is related to beliefs and constructs (Brehmer 1987; Sjöberg 1979).

For the purpose of this deliverable, we will follow to the more technical understanding of risk presented earlier. It is through the idea of "risk perception" that we will introduce the importance of mental models and in risk research, understanding that collective and individual behaviour are heavily impacted by risk perception, and they are an important factor in determining the risk reduction measures adopted (Flint and Luloff 2005)

Defining wildfire risk

In the context of wildfire, we find that similarly to what occurs with the definition of risk, there is also not one single definition of *fire risk*. The FAO terminology, one of the most commonly used, understands wildfire risk as "*the chance of a fire starting as determined by the presence and activity of any causative agent*" (FAO, 1986 in J. San-Miguel-Ayanz et al., 2017). Along similar lines, (Hardy 2005) understands that fire risk *"refers exclusively to the probability of a fire ignition*" (p. 77). At this point however, it is important to mark the difference between fire initiation and fire ignition. It is possible to have a fire ignition that does not develop into a wildfire if the conditions are not right (San-Miguel-Ayanz et al. 2013). Other approaches include, within the fire risk definition, not only the probability of a wildfire to occur, but also its consequences, thus, including the vulnerability as well (San-Miguel-Ayanz 2002).

Along these lines, the most recent definition adopted by the European Forest Fire Information System (EFFIS) to accommodate the information available at the pan-European level defines wildfire risk as "*the combination of fire hazard and fire vulnerability, namely hazards related to the presence of fuels and ignition sources, and vulnerability related to the assets at risk*" (J. San-Miguel-Ayanz et al., 2017 p.296). To summarize this definition, the JRC-EFFIS proposes the following scheme to structure the assessment of wildfire risk analysis (see Figure 2). The scheme, and the definition, highlights the difference between fire hazard (fire danger, in the figure) and vulnerability. Whereas fire danger can be understood as the sum of conditions under which an ignition could develop into a wildfire, vulnerability refers to the possibility of damage inflicted to either ecological or socioeconomic values (San-Miguel-Ayanz et al., 2017).

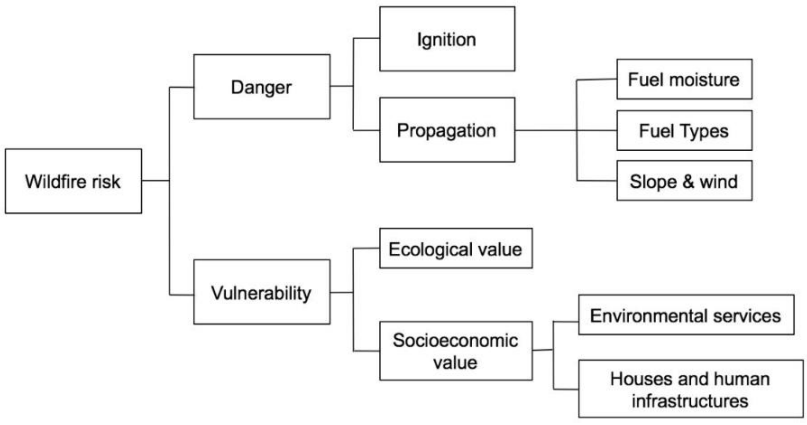

Figure 2: Components of wildfire risk assessment. Source: San Miguel Ayanz et al., 2018 p.8

3.2 An approximation to risk perception in the wildfire field

Risk perception research has been grounded in the studies of judgment and decision-making processes, understanding the set of strategies that people employ to face scenarios of uncertainty (Slovic, Fischhoff, and Lichtenstein 1982). The concept of risk perception can be understood as the "*social process that selects certain risks corresponding to the predominant social structure*" (Douglas and Wildavsky 1983, in McCaffrey, 2004). This notion of perception is very relevant for the purpose of explaining the difference between theoretical and actual course of action in the face of risks.

Flint & Luloff, (2005) explain: "*what people think, and the cultural worldviews of people are what make risks real*" (p.402). This individual set of views constitutes the perception from where a hazard is judged, impacting the attitudes towards it. Additionally, it is also important to understand not only how people perceive and react to risk individually, but also collectively, in order to design and implement the appropriate policies (Slovic et al. 1982). Along these lines, McCaffrey (2004) points out that in order to have a more comprehensive grasp of wildfire management, it is very important that risk perception is understood from as many perspectives as possible. She highlights the importance of studying wildfire risk perception, in order to shed light on how actors perceive wildfire risk and how it shapes their attitudes and frame of action.

Wildfire risk perception has been one of the most relevant areas of inquiry for the social sciences in the wildfire field, particularly in the United States. The motivation behind was to improve the efficacy of government agencies and policies for managing fuel in partnership with homeowners (Jakes 2007), as well as to promote risk reduction action on private land (Brenkert-Smith et al. 2013). However, the comprehension of the broader social processes, the social structures, influencing wildfire risk perception, as well as the impact of information sources on the amplification -or not- of risk are not fully understood (Brenkert-Smith et al. 2013; Champ and Brenkert-Smith 2016). Being able to grasp all these factors that influence individual and community risk perception could bring a better understanding of the concerns and views on the hazard and their management and make possible adjustments at the policy level (Slovic et al., 1982).

4. Wildfire risk perception and land management in Southern Europe

Wildfire outbreaks, progression and spread are influenced by the fire environment, as well as human activities such as land use and land management (Tedim et al. 2019). Land use change, as explained in 1.2, constitutes one of the most important factors driving fire regimes. Other territorial processes, such as the rural exodus, not only have a physical influence on fire behaviour but also on the vulnerability of human systems, since it is usually linked to resource depletion in the area, and as a consequence, a decreased capacity of coping with disturbances such as wildfires.

The relationship between land management and wildfire risk is, however, not straightforward. Despite the many generalizations that can be made, the drivers and consequences of rural abandonment are diverse, and are strongly site-specific. In Portugal, for example, the rural exodus that occurred in the 1960s affected different areas differently. In the southern part of the country, properties were large, and allowed the agricultural activity to persist, and as a consequence to have access to European funds. However, in the northern and central regions of the country, properties were too small to be economically profitable, and as a consequence, they were either abandoned, or converted into forest plantations, mainly eucalyptus and pines (Bouillon et al. 2019). As a result, the wildfire risk is much higher in the north and centre, compared to the south. Our fieldwork in Portugal also showed that the

aging population in the rural regions of central and northern Portugal also plays a role. When their land is impacted by a wildfire, land abandonment is accelerated, including the abandonment of the tree plantations, because the long-term investments that are necessary are no longer attractive for the owners.

It is however in the context of Wildland Urban Interface (WUI) where wildfire risk, and especially wildfire risk perception is more commonly linked to land management at the individual level. This has also been the objective not only of scientific research or public authorities, but also of some environmental NGO's such as Greenpeace Spain, through its campaign "Protege el Bosque, Protege tu Casa" (Protect the Forest, Protect your House) (Greenpeace España 2018). As urban sprawl towards high wildfire risk areas continues, it is very important to understand individual behavior based on wildfire risk perception (McCaffrey 2004). This has been supported by our findings in the field, in which we have found that wildfire managers and authorities are often interested in understand how to change individual's behaviours and perceptions, so that people choose to modify the environment around their building to decrease fire intensity and minimize ignition sources.

However, the relationship between risk perception and behaviour is not straightforward, nor is it homogeneous across individuals. For example: Two individuals sharing the same knowledge and awareness levels will not necessarily behave equally in the face of wildfire risk. Other issues such as resources, class, race, gender or even collective behaviour can play role. In fact, there is ample evidence that risk perception does not, in itself, lead to any particular type of behaviour (Almeida Colaço 2017; McCaffrey et al. 2020).

4.1 Fire risk perception within individuals and their communities

Following McCaffrey (2004), it is possible to separate the factors influencing individual's and local communities' perception of natural hazards into two major groups:
personal factors, such as years of living in the area, past personal experience with the hazards,
factors influencing the capacity of action, for instance, the availability of sufficient resources to act, or the importance of the risk in contrast to other daily concerns.
Additionally, it is important to acknowledge that another factor that determines individual perception is how they calculate the probability of a fire occurrence and the magnitude of the damage.

The influence of experience on risk perception has mainly been discussed as a key factor influencing the perception and the motivation for more active land management in relation to hazard exposure (Almeida Colaço 2017; Mileti 1980). In fact, our literature review shows that the result of experience does not necessarily have a positive impact on risk perception, nor on the readiness of landowner's and communities' to embrace preparedness to fire risk (Almeida Colaço 2017). Champ and Brenkert-Smith (2016), for example, differentiate between the perceived probability of an event occurring, and the perceived consequences. According to their results, experiencing a wildfire has a limited influence on the perceived risk of a fire occurring. It does, however, influence slightly the perceived consequences. As evidenced in an interview with a local practitioner in Valencia, Spain:

> *"People are like gnus. Gnus lose the feeling of danger after 12 seconds and come back to cross the river again. And we are the same for 4 months or a year".*

The interviewee, a forest engineer, refers to how at the local level, although they may experience a wildfire, after months they may minimize the risk of a fire occurring again, and in consequence minimize their actions to mitigate that risk.

Despite these nuances it must be acknowledged that experience and perception of capacity of action vary with a myriad of variables like gender, age, access to education and/or professional activity. A study in central Portugal concluded that, despite the personal experience of facing a wildfire event and having access to education, individuals are not familiar with wildfire terminology used by the scientific and policymakers communities which may constrains the possibilities to improve communities' preparedness Oliveira (Oliveira, Oliveira, and Xavier Viegas 2020). On these particularities of how the perception could be contextually shaped, and interviewee from Portugal, on reference to urban perception of fire risk, pointed out:

"People think that because they don't have any kind of property it's not their business to take care of or to be aware for about these problems (…) They don't even know how to do or the concept of Land Management or how to manage themselves if they get caught in a situation like that. Because they're in their own holidays. In 2017, in June there were a lot of good urban people, so people from the cities that were caught and died in those kind of in a wildfire"

This quotation reinforces the argument by Mileti (1980), asserting that the lack of experience - in this case of a past wildfire experiences by urban inhabitants - influences not only the perception of risk by also the motivation to know *protective responses* in relation to the hazard. The lack of personal experience may constrain the knowledge of how to react to the hazard, as it was the case of the fire events of Portugal in 2017. On the other side, it shows the perception of how urban and rural areas are disconnected in terms of perception of the fire risk.

On the same note, a firefighter interviewed in Valencia pointed out:

*"**If you go to a urban area, the perception of risk is different.** "There is a fire, evacuate me". So the person who is more linked to the countryside, knows (…) If this pine tree is greener, if this vegetation is more stressed, is seeing how the crops are doing, really knows how the year is going and really knows what the perception of fire risk is. (…) However, the urban citizen does not. The urbanite is only looking for a beautiful landscape"*

The interviewee points out a crucial aspect of rural landowner's risk perception, that is the knowledge of the local ecosystems and may have a more correct perception of fire danger in their territory. Nevertheless, as fire regimes change, fire risk increases and social dynamics evolve, some claim that local knowledge on land management is not necessarily of help, when trying to reduce wildfire risk, as it can be seen in the quotation below:

*[Rural landowners] have a lot of knowledge about the state of the forest, much more than I have, even if I go for a walk there. But what they don't have is the **knowledge of the consequences of this**, beyond what affects them personally, and it affects them less and less. Why? Because they are less and less dependent. I mean, now they do not have their heating by collecting firewood in the bush, so, as they have been needing less, and depending less on the natural space, which is something that we have taught them to do very well from the city, they have had less capacity of empathy with the environment. **I think they know much more about the state of the forest, but they are much less***

***concerned about it than their grandparents**. So you are the one who can be more worried because you know what is going to happen and you know the consequences of all that"*

This statement provides evidence that although wildfires are indeed perceived as a risk, to achieve a better understanding of its consequences and ensure communities' resilience, an improvement is needed of "the knowledge of actual exposure to the risk and the effective response in the event of an emergency, as well as a better understanding of the differences between the ecological role of fire and the risk-prevention measures associated with catastrophic wildfires" (Rego et al., 2018, p. 20).

4.2 Fire risk perception at the policy level

Within the policy studies, the ''windows of opportunity'' are exposed as critical timeframes in which adjustments in behaviour or new policies are most likely to occur (Kingdon, 1984 in McGee, McFarlane, & Varghese, 2009). In their paper, McGee et al., 2019 describes how in the hazard field, research has found that after an external shock, such windows of opportunity can open, which allow for better preparation for the future (Olson, Olson, and Gawronski 1998; Rodríguez Fernández-Blanco et al. n.d.) This is also true in the case of health events, in which individuals may adopt a more risk-reducing attitudes after a negative diagnosis (Mcbride, Emmons, and Lipkus 2003). This analogy between a hazard and a disease was also mentioned during one of the interviews in Portugal:

*"**Wildfires are just the symptom of the disease**. We are not fighting the disease. We are fighting the symptoms. The wildfires are symptoms from the big disease. Big disease is just the rural human desertification, lack of management of the territories. Total economy failure inside these territories. We need to put money, these millions. We need to put them in the economy in their spaces. We have to put the millions there, to people that are there, to dynamize, to create value. If we create value there, we create economy. We create dynamic, we create employment and when we do this, we solve wildfires because we have land management, we have people" –*

This statement by a local expert, highlights that in the field of wildfire risk there is a need to look beyond the symptoms and act on the deeper factors driving the wildfire issue. A common denominator found across the interviews both in Portugal and in Spain is the close relationship that interviewees identify between rural decline and wildfires. More specifically, many draw the attention to the importance of economic dynamization of rural areas in order to mitigate the effects of rural exodus and land abandonment. This is a crucial element, as some interviewees have noted, particularly in Spain, have noted that "bringing people back to the rural to telework is not a solution, if they are not to manage the land"

Based on the literature review and our fieldwork, we acknowledge that often times, a hazardous event, such a wildfire is followed by an opening of a window of opportunity, which can lead to further development and implementation of policy and/or management measures. It is important to highlight, however, that sometimes these learning opportunities are missed, or not fully used, due to the "scientification" or "depoliticization" of the conversation in the aftermath of the event (González-Hidalgo, Otero, and Kallis 2014). This issue, however, is still under-researched in the field of wildfires.

The possibilities of change in policies and regulations can also be constrained by public opinion and different stakeholder demands, each shaped by different interpretation and framing of the wildfire issue, and the best strategy to cope with it (Castelló and Montagut 2019). Thus, the perception of

wildfire risk at the societal level could, for instance, demand more resources in fighting large fire (short-term solution), as opposed to the mainstream expert opinion, which suggests that more investment should be made in prevention, instead of suppression (Plana, Font, and Green 2015). This is also well reflected in the interviews:

"In the economy and land management, they are creating laws, but laws are a very simple and very cheap thing to do. Now it's time to put this effective in the land, this is the hard part. This is the hard and expensive part (..) But what I saw and see in the Europe, is nothing of this. We have several experts from the wildfire business, from Spain, France, Italy. We are always telling the same thing to the European Commission, to the government: "We need land management, we need social policies in the rural areas", and the European Commission told the experts, "Don't worry. We already bought Canadairs and helicopters". But we aren't asking for Canadairs and helicopters, we are just asking for land management and rural policies."

This statement evidences that high impact actions, such as major changes on rural development policies and land management are often low on the priorities, because they are considered "low profile"; instead, more visible responses, are often preferred (Plana et al. 2015). Building on the latter, a wildfire expert mentioned that:

"[after the 2017 events, the Agency was created] And one of their goals is to make these landscapes more resilient or more, not just to fire, so more productive, more sustainable (…) it's related with attracting people, maintaining people creating jobs, creating an economy, changing the landscape. It could be part of general forest management policy, not a fire management policy"

This statement of how the wildfire 2017 events lead to the creation of the AGIF (Agency for the integrated Management of Rural Fires in Portugal), evidenced how past events can foster policy changes; considering, that the perception of the wildfire risk evolves along with wildfire events experiences.

5. Conclusion and outlook

The information included in this deliverable is part of a larger PhD research which incorporates a critical social science perspective to the field of wildfires, and particularly to the study of socio-ecological resilience in fire-prone territories. In this sense, we understand that the study and comprehension of the different wildfire risk perceptions and sensibilities, as well as the related land management is an important element. However, whereas resilience approaches call for co-construction and participative methods, our literature review and fieldwork point towards a very strongly established top-down approach in the forestry and wildfire arenas, in which the goal for understanding risk perceptions of the different stakeholders is to be able to change them, according to a very specific problem framing. As a consequence, this generates conflict and low levels of trust among certain groups, which in turn hinders resilience building at the territorial level.

Something that was particularly outstanding from our interviews thus far was that populations in both countries were fairly aware of the wildfire risk their territories were exposed to. However, this did not necessarily mean that wildfires were a top priority when asked about the biggest challenges at the local

level. This meant that, despite significant awareness of wildfire risk, there was not a sense of urgency nor of need of a radical paradigm change. It was more the deeper, structural variables that were mentioned more often by most interviewees. (e.g. rigid regulation, depopulation, or lack of significant rural development strategies). In this sense, the problematization of the wildfire issue by the different interviewees, as well as the solutions put forward seem also to be embedded in ethical values and worldviews which went well beyond the wildfire realm.

This has important implications when trying to extrapolate these results or make sense of them in the wider European context. Risk perception may be high or low, but there are many other structural, socio-political and historical variables at play in a territory, therefore making socio-ecological resilience building, a very context-specific and territorially embedded process.
In this sense, it will be important to understand how societies who have not been traditionally exposed to wildfires, nor are they used to them, how do they problematize the wildfire issue, and the solutions put forward by different stakeholders. It is in the constructive and inclusive dialogue between the different options, grounded in the best available science, that socio-ecologically resilient territories will arise.

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